Operating Instruction Manual

TOA ELECTRONIC MUSIC AMPLIFICATION SYSTEM

ModelKD-3

TOA Corporation
KOBE, JAPAN

● Contents

● Precautions

1. Power Supply
The KD-3 is designed to operate on local AC (50/60Hz) Mains, ±10%.

2. XLR Type Audio Connector
The connectors are wired as follows.
The pin 1 is ground (shield), the pin 2 cold (low, minus), the pin 3 hot (high, plus).

3. Phantom Power Supply
The phantom power switch on channel 1 input permits the user to supply 48V DC through the input connector to a condenser microphone. If phantom power is not required, the switch must be in the "off′ position.

4. Description of components and functions of the KD-3
Various descriptions are applied, depending on each manufacturer. In our Operating and Instruction. Manual explanation of components and functions is made according to TOA's usage for them.

General Description

The TOA KD-3 is a complete electronic music amplification system in a single portable package, consisting of a stereo mixer, spring reverberation unit, graphic equalizer, power amplifier, and two-way speaker system.

The mixer section provides four input channels. Each input features 2-band active EQ, an independent effects send, a clip LED indicator, a direct output, and a channel level control with concentric balance control. Channel 1 features an electronically balanced XLR mic input connector with switchable 48 volt phantom power, for use with condenser-type microphones, and each input channel features input sensitivity switches. In addition, channel four features an RIAA equalized phono input for direct connection of magnetic cartridge turntables.

The master section contains an effects patching loop with crossfade and level controls, 5-band EQ stereo L&R controls, and a stereo headphone monitoring system.

The 220 watt RMS internal power amplifier features Auto Comp compression circuitry, with an LED indicator, to ensure distortion-free performance and protection for the internal speaker system. The two-way speaker system utilizes a heavy duty 15-inch woofer and a constant directivity horn with piezo electric driver.

The KD-3 is covered in a durable and attractive high tech gray vinyl fabric.

Features

System Features

- Four input channels
- 220 watts/4-ohm, 150 watts/8-ohm power amplifier output
- Auto Comp compression circuitry w/indicator
- Power amplifier protection circuitry w/indicator
- Built-in, heavy-duty two-way loudspeaker system of 15"(38cm) woofer and constant directivity horn with piezo driver
- Built-in spring reverberation unit
- MIDI Thru circuitry

Each Input Channel

- Two band EQ
- Independent effect send is post-EQ/post-fader
- Direct output on each channel, ideal for recording
- Concentric balance control and channel volume control
- LED clip indicator for best signal to noise ratio
- Individual Input Level Selector switches
- Input Channel 1 has electronically balanced XLR microphone input connector with switchable 48 volt phantom power
- Input Channel 4 has stereo phono (RIAA) inputs for turntable with magnetic cartridge

Master Section

- Stereo Left and Right outputs with both RCA and 1/4" phone jacks
- Level and crossfade control for returning effects signals to stereo mixing busses
- Two band EQ for internal reverberation unit
- Headphone monitoring for Stereo L and R, SUM and EFF
- Five band graphic equalizer w/bypass switch
- Complete patch bay

Front Panel

Effect Control [EFF]
This control determines the amount of post-fader/post-EQ signal assigned to the effect buss from a given input channel, and thus the level of effects for that channel.

Clip LED Indicator [CLIP]
The LED indicator lights when the pre or post EQ signal level reaches 3dB below clipping, giving a visual reference for optimum setting of the level control. Under normal usage, the clip LED's should only flash intermittently. A constant or steady LED indicates that the input level control setting is too high, and should be reduced.

Low Equalizer Control [LOW]
The low EQ control alters the low frequency response of the input channel, providing ±15dB at 20Hz of continuously variable active shelving equalization. The "0" detented position provides flat audio response. Please note that excessive boosting of low frequencies may cause the input clip LED to light. Under these circumstances, it may be necessary to lower the input level control in order to maintain proper headroom and minimize distortion.

High Equalizer Control [HIGH]
The high EQ control alters the high frequency response of the input channel, providing ±15dB at 20kHz of continuously variable active shelving equalization. The "0" detented position provides flat audio response.

Balance Control [BAL]
This control adjusts the level balance of the channel input signal fed to the Stereo Left and Right mixing busses.

Input Channel Level [LEVEL]
The level control provides continuously variable adjustment of the channel output to the Stereo Left and Right mixing busses, thus determining the level of the channel in the main sound system mix. The nominal level of the input level control is at the "0" dB position.

Graphic Equalizer In/Out Switch [IN/OUT]
The in/out switch enables comparison between a flat response (OUT) and the equalized response (IN). The "out" position completely removes the equalizer from the KD-3 circuitry.

Graphic Equalizer Control [GRAPHIC EQUALIZATION]
The graphic equalizer is 5 independent active bands (filter), providing 15dB of boost or cut at each center frequency. The "0" detented position provides flat audio response.

Internal Reverb Equalizer-Control [REV EQ HIGH/LOW]
These controls alter the frequency response of the built-in reverb circuitry. The "0" detented position of both controls provide flat audio response.

Cross-fade Control for Reverb and Effect [REV/EFF X-FD]
When this control is in the center position, the reverb signal (thus the internal reverberation unit) and EFF RET signals are equally assigned to the Stereo mixing buss. Rotating the control counter-clockwise decreases the EFF RET signal level, keeping the original level of the reverb signal. Rotating the control clockwise decreases the reverb signal level, keeping the original level of the EFF RET signal.

Level Control for Reverb/Effect [REV/EFF LEVEL]
This control governs the amount of reverb signal through the reverberation unit (built in), and effect signal returned through the effect return jack (EFF RET) to the stereo mixing buss. The signals of reverb signal and EFF RET are controlled simultaneously.

System Level Control [SYSTEM LEVEL]
This control determines the overall level of the KD-3 system.

Stereo Level Control [STEREO LEVEL]
These concentric controls determine the overall level of the Stereo Left and Right output (STEREO OUT L, R).

Aux Input Level Control [AUXIN]
These concentric controls govern the amount of Aux signals to Stereo Left and Right through the Aux In jacks (AUX IN L, R).

Headphone Selector, Level Control, and Jack [PHONES]
An output jack, level control, and 3-position rotary switch are provided for the use of headphones. Any one of three signals can be monitored through headphones using the selector switch: STEREO, SUM, or EFF. All monitored signals are in mono with the exception of Stereo Left and Right which are monitored, of course, in stereo. The level control adjusts the volume of the headphones, and the headphone jack will accept any stereo headphones with an impedance of 8 ohms or higher.

Clip LED Indicator [CLIP]
The Stereo and Sum clip indicators light when their respective signals reach 3dB below clipping, giving a visual indication before the onset of distortion.

Sum Pro/Post Select Switch [SUM SELECT]
The mono Sum (System) signal is derived by summing the Stereo Left and Right signals. The Sum Select switch determines whether this summing occurs before or after the Master Stereo faders. When using the switch in the Pre-position, the Sum (System) output level is independent of the Master Stereo Left and Right level controls. In the post-position, adjusting the Master Stereo Left and Right level controls will affect the volume of the Sum (System) output.

Power/Protect LED Indicator [POWER/PROTECT]
The LED indicator lights red and remains lit for 3 seconds after the power switch has been turned on, and then turns to green when the KD-3 is powered up. The LED lights red when the protection circuit is activated.

Power Amp Compression Indicator [COMP]
The Comp LED lights when the internal compressor is activated. The compressor is provided to protect the speaker system by compressing the input signal level of the power amplifier when clipping occurs in the output stage. Frequent flashing of the LED is not reason for alarm. However, a constant or steady light indicates that the KD-3 is being overdriven and that the internal power amplifier is possibly "under powered" for that particular application. The output level of the KD-3 should be decreased until the LED only flashes intermittently.

MIDI LED Indicator [MIDI IN]
This LED indicates the presence of MIDI data at the MIDI input connector on the rear panel (MIDI IN).

Rear Panel

Stereo L&R Output Jack [STEREO OUT L/R)
The unbalanced RCA pin jacks and 1/4" phone jacks are wired in parallel. The RCA pin jack has a nominal output level of —10dB and an impedance of 1k ohms, and the 1/4" phone jack has a nominal output level of +4dB and an impedance of 1k ohms. All jacks may be used simultaneously.

Effect Send Jack [EFF SEND]
This 1/4" phone jack is used in conjunction with the Effect Return jack to connect an outboard effects device (i.e. delay or reverb) to the KD-3. The Effect Send jack should be connected to the input of the Effect. Nominal output level is -10dB with an impedance of 1k ohms.

Effect Return Jack [EFF RET]
This 1/4" phone jack is used in conjunction with the Effect Send jack to connect an outboard effects device (i.e, delay or reverb) to the KD-3. The Effect Return jack should be connected to the output of the effect. Nominal input level is —20dB with an impedance of 10k ohms.

Aux Input Jack [AUX IN L/R]
The unbalanced 1/4" phone jack have a nominal input level of -20dB and an impedance of 10k ohms.

Input Level Selector [PAD]
The slide switch provides adjustment of the sensitivity of the 1/4" Input Jacks, and RCA pin Input Jacks, providing 30dB of attenuation at the "30dB" position. The correct setting should be made according to the output level of the equipment connected.

Sum Output Jack [SUM OUT]
The Sum Output jack has a nominal output level of +4dB and an impedance of 1k ohms.

1/4" Phone Channel Input [INPUT L/R]
These connectors are unbalanced, standard 1/4" phone jacks with an input impedance of look ohms, and an input level of —30dB. When a plug is inserted into the 1/4" input jack, the corresponding XLR microphone input or RCA pin (TAPE IN) channel input is automatically switched out of the input circuitry.
Note : Connect to "INPUT L" when an instrument has a stereo (Tip-Ring-Sleeve) output from a single balanced 1/4" phone plug. The instrument's Stereo Left and Right channels are automatically assigned to the Stereo Left and Right busses, respectively.
Connect to both "INPUT L & R" (2-cables) when on instrument has a stereo output from two unbalanced 1/4" phone plugs (Tip-Sleeve). The instrument's Stereo Left and Right channels are then assigned to the Stereo Left and Right busses, respectively.
Connect to "INPUT R" when the instrument has a mono-output. The mono signal will automatically be assigned to both Stereo Left and Right busses.

Phantom Power On/Off switch [PHANTOM]
This switch alternately turns "on" and "off the phantom power(48VDC) for the XLR connector assigned to Channel 1. This switch should remain in the "OFF" position when a microphone requiring external power is not connected.

Balanced XLR Microphone Input [MIC]
The XLR-type microphone input connector (channel 1 only) is electronically balanced with a nominal level of —60dB and an input impedance of 1k ohms. Phantom powering is provided for use with condenser-type microphones (see PHANTOM). The microphone input is automatically disconnected when either the corresponding RCA Pin jack or the 1/4" phone jack is used.

RCA Tape Input [TAPE IN L/R]
The RCA pin input jack is unbalanced, with a nominal level of —30dD and an impedance of 100k ohms.

Direct Output [DIRECT OUT L/R]
The Direct Outputs on each channel utilize an unbalanced RCA pin jack with an impedance of 1k ohms and a level of -10dB. The Direct Outputs are post-EQ/post-fader, and are useful both for recording and for sending individual instruments to a main PA mixer through direct boxes.

Graphic Equalizer Output Jack [GEQ OUT]
This jack allows the KD-3 and the internal graphic equalizer to be used with an external power amplifier, or in conjunction with the GEQ in jack, to be used independently of all other KD-3 circuitry. Nominal output level is +4dB with an impedance of 1k ohms.

Power Amplifier Input Jack [POWER IN]
The Power Amp Input jack allows the internal power amplifier to be used with external equipment. When a plug is inserted, the power amplifier is automatically disconnected from the KD-3 mixer section. The nominal input level is +4dB with an input impedance of 10k ohms.

Graphic Equalizer Input Jack [GEQIN]
The GEQ input jack allows the graphic equalizer to be used independently of the KD-3 with other external equipment, or the internal power amplifier and the graphic equalizer with external equipment. When a plug is inserted, the main mix from the system buss is disconnected from the graphic equalizer and the power amplifier. The nominal input level is +4dB with an input impedance of 10k ohms.

MIDI Thru Connectors [MIDI THRU]
The MIDI signal from the MIDI Input connector (MIDI IN) is split and sent unaltered to the four MIDI Thru connects on the KD-3, if used. Each of the MIDI Thru connectors can be connected a different synthesizer's MIDI Input connectors, allowing one MIDI keyboard or sequencer to control up to four other MIDI devices.

MIDI Input Connector [MIDI IN]
This connector will accept the MIDI output of any synthesizer, sequencer, or other MIDI device. Use of non-MIDI-standard DIN cables, or of cables longer than 5m (16ft.) may result in improper operation and data loss.

RCA Phono (RIAA) Input [PHONO]
These RCA pin jacks have a nominal level of -55dB and an impedance of 50k ohms, and include RIAA phono equalization.

Input Level/Source Selector [PAD]
When using the RCA Phono Inputs, select the "PHONO" position of this switch.

AC Power Cord
The power cord is of the three-wire type with proper grounding facilities built-in. (6ft.)
Caution — The ground pin should not be removed under any circumstances. If the KD-3 must be used without proper grounding facilities, a suitable grounding adapter should be utilized. Operation of the KD-3 with proper grounding techniques will result in less system noise and greatly reduced shock hazard.

Earth Terminal [GND]
This terminal can be used to ground other devices such as tape decks and turntables to the KD-3 to reduce hum and shock hazard.

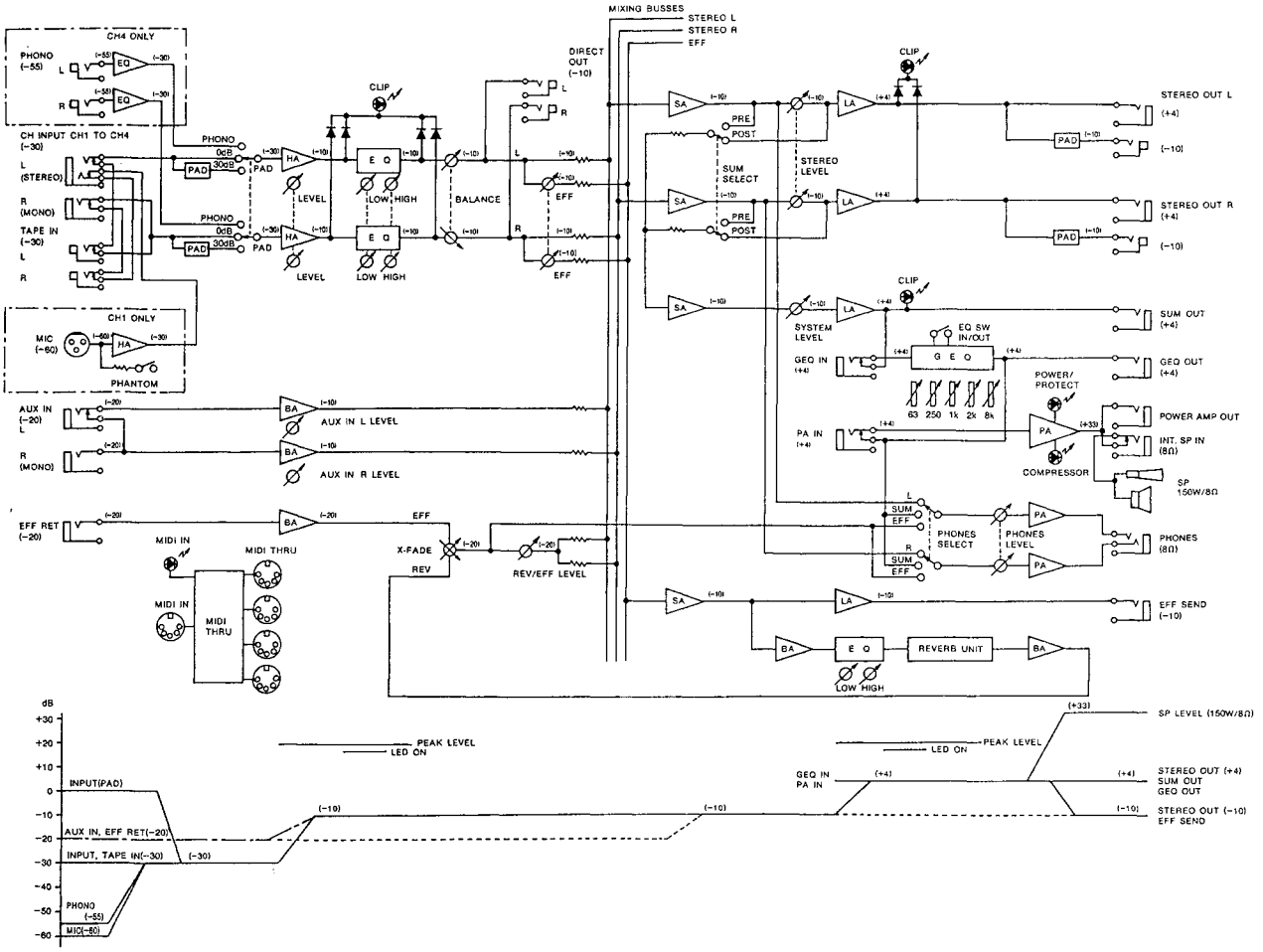
AC Fuse
Warning : To avoid possible equipment damage and/or personnel injury, the fuse should always be replaced with same type and rating. Using improper fuses will also void the warranty. The KD-3 should always be disconnected from AC outlet prior to changing fuses. If fuse repeatedly fails, the unit should be referred to qualified personnel for repair.

Power Switch [POWER]
The power switch is a three-position type with the middle position being the "off position. The KD-3 should be operated in the switch position which produces the lowest amount of system hum.

Internal Speaker Input Jack [INT. SP INPUT]
This jack is provided to drive the KD-3's built-in speaker system with an external power amplifier. Its maximum program input power capacity is 240 watts, with an impedance of 8 ohms. When a plug is inserted in the jack, the built-in speaker system is automatically switched out of the KD-3's built-in amplifier.

Power Amplifier Output Jack [POWER AMP OUT]
The power output jack delivers 220 watts into a minimum 4-ohm load, and is used to connect with external speaker system.
Note: Do not connect to an external speaker system with less than 8 ohms when the internal speaker system is used simultaneously.

● Block and Level Diagrams



● Specifications

MIXER SECTION

Frequency Response
+0, -3dB 20Hz to 20kHz (INPUT to STEREO OUT)

Total Harmonic Distortion
Less Than 0.03% +4dB* 1kHz (STEREO OUT)

Hum and Noise (STEREO OUT: Open 20Hz to 20kHz)
All Level Control Minimum —85dB
One INPUT Level Control Maximum —68dB

Equalization
LOW ±15dB 20Hz Shelving
HIGH ±15dB 20kHz Shelving

POWER AMPLIFIER SECTION

Power Output
150 watts minimum sine wave continuous average power output monaural driving 8-ohms over a power band from 20Hz to 15kHz. The maximum Total Harmonic Distortion (THD) at any power level from 250 milliwatts to 150 watts shall be no more than 0.3%.
150 watts continuous average sine wave power into 8-ohm with less than 0.02% THD at 1kHz.
220 watts minimum sine wave continuous average power output monaural driving 4-ohm over a power band from 20Hz to 15kHz. The maximum Total Harmonic Distortion (THD) at any power level from 250 milliwatts to 220 watts shall be no no more than 0.3%.
220 watts continuous average sine wave power into 4-ohm with less than 0.02% THD at 1kHz.

Frequency Response
+0dB, -1dB 20Hz to 20kHz

Total Harmonic Distortion
Less than 0.02% at 150 watts into 8-ohm at 1kHz
Less than 0.02% at 220 watts into 4-ohm at 1kHz

Hum and Noise
-67dB below rated output (IHF-A weighted)

SPEAKER SECTION

Speaker
15"(38cm) woofer, CD horn and piezo driver

Sensitivity
97dB (1 watt 1 meter),

Frequency Response
70Hz to 20kHz

GENERAL SPECIFICATIONS

Power Consumption
450 watts maximum

Dimensions (WxHxD)
490mm x 719mm x 341mm
19¼"x28¼"x13⅜"

Weight
30kg (66.1 lbs)

● Specifications

INPUT SPECIFICATIONS

Input	Actual Load Impedance	For Use With Nominal	Input Level		Connector
			Nominal	MAX. Before Clip	
CHANNEL INPUT (L, R) CH1~CH4	100kΩ	100kΩ OR LOWER IMP. LINES	-30dB (24mV)	0dB (0.775V)	STEREO PHONE JACK PHONE JACK
TAPE IN CH1~CH4	100kΩ	100kΩ OR LOWER IMP. LIMES	-30dB (24mV)	0dB (0.775V)	RCA PIN JACK
MIC CH1	1kΩ	50Ω TO 250Ω MICROPHONES	-60dB (0.78mV)	-30dB (24mV)	XLR-3-31 TYPE
PHONO CH4	50kΩ	MAGNETIC CARTRIDGE	-55dB (1.4mV)	-25dB (44mV)	RCA PIN JACK
AUX IN L,R	10kΩ	10kΩ OR LOWER IMP. LINES	-20dB (78mV)	+10dB (2.45V)	PHONE JACK
EFF RET	10kΩ	10kΩ OR LOWER IMP. LINES	-20dB (78mV)	+10dB (2.45V)	PHONE JACK
GEQ IN	10kΩ	10kΩ OR LOWER IMP. LINES	+4dB (1.23V)	+20dB (7.75V)	PHONE JACK
PA IN	10kΩ	10kΩ OR LOWER IMP. LINES	+4dB (1.23V)	—	PHONE JACK
INT. SP INPUT	8Ω	—	—	(240W)	PHONE JACK

0dB is referenced to 0.775V RMS.

OUTPUT SPECIFICATIONS

Output	Actual Source Impedance	For Use With Nominal	Output Level		Connector
			Nominal	MAX. Before Clip	
STEREO OUT (L,-R)	1kΩ	1kΩ OR HIGHER IMP. LINES	+4dB (1.23V) -10d B (245mV)	+20dB (7.75V) +6dB (1.5V)	PHONE JACK RCA PIN JACK
SUM OUT	1kΩ	1kΩ OR HIGHER IMP. LINES	+4dB (1.23V)	+20dB (7.75V)	PHONE JACK
EFF SEND	1kΩ	1kΩ OR HIGHER IMP. LINES	-10d B (245mV)	+20dB (7.75V)	PHONE JACK
PHONE S	100 Ω	8Ω OR HIGHER	+4dB (1.23V)	+20dB (7.75V)	STEREO PHONE JACK
DIRECT OUT (L.R)	1kΩ	1kΩ OR HIGHER IMP. LINES	-10d B (245mV)	+20dB (7.75V)	RCA PIN JACK
GEQ OUT	1kΩ	1kΩ OR HIGHER IMP. LINES	+4dB (1.23V)	+20dB (7.75V)	PHONE JACK
POWER AMP OUT	—	8 Ω	(220W/4n)	—	PHONE JACK

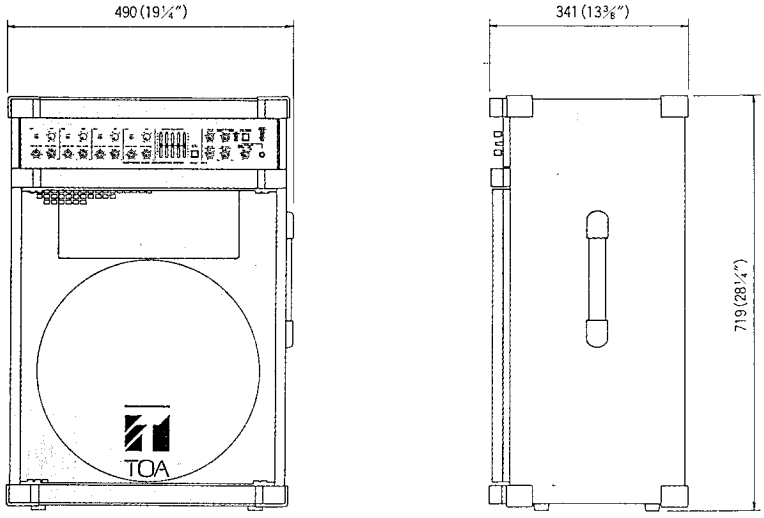
Stereo phone jack is wired:
Tip=Left, Ring=Right, Sleave=Common.
The XLR type connector is electronically balanced.

The XLR type connector is wired as follows
PinNo.l-Ground
PinNo.2-Cold(Low)
Pin No.3-Hot (High)

0dB is referenced to 0.775V RMS.

Specifications are subject to change without notice.

● Appearance



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